ABSTRACT

Porcine reproductive and respiratory syndrome virus (PRRSV) causes serious economic losses in swine. The present invention determined that CD 151 is a susceptibility factor for PRRSV infection by transfecting a cell line which is not susceptible to PRRSV infection (BHK-21) with CD 151, which rendered the cell line susceptible. Because CD 151 can be accessed in cellular material including blood platelets and germplasm, the present invention provides a non-invasive method of screening different swine for susceptibility to PRRSV, thereby improving breeding plans. In the case of a valuable animal, results from such screening can indicate any offspring's susceptibility to PPRSV. Additionally, the viral RNA-CD 151 interaction possesses high affinity and can be used as a tool to detect anti-viral compounds which can be further improved by using combinatorial chemistry. Accordingly, anti-viral compounds that can block the viral RNA-CD 151 interaction can be developed. Advantageously, transfection of CD 151 into non-simian cell lines can confer susceptibility to PRRSV and these recombinant cell lines can be used for preparation of biologics that will avoid simian cell lines which could be a source of primate viruses in xenotransplanted organs from pigs. Finally, the present invention describes the basic mechanism by which the virus RNA enters a target cell. This novel class of proteins is termed viral RNA entry proteins and a novel class of compounds named anti-RNA Entry Proteins can be used to block the entry of viral RNA, thereby preventing viral infections.